MANNED SPACE **FLIGHT**

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Technical Information

Master Control

PROGRAM DIRECTIVE

APOLLO FLIGHT MISSION (NASA-TM-X-56528) ASSIGNMENTS (National Aeronautics and Space 14 p Administration)

N79-76132

Unclas 11016

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APOLLO FLIGHT MISSION ASSIGNMENTS



JULY 21, 1964



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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION WASHINGTON, D.C.

CASE FILE COPY

APOLLO FLIGHT MISSION ASSIGNMENTS

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Date Effective:

July 21, 1964



Manned Space Flight
National Aeronautics and Space Administration
Washington, D. C.

Available to MACA Officerally

MANNED SPACE FLIGHT

DIRECTIVE

M-DE 8000.005C

PROGRAM REQUIREMENT DOCUMENT

This document is an official release of Manned Space Flight and its requirements shall be implemented by all cognizant elements of the Manned Space Flight Program.

The effective date of this document is July 21, 1964

Approved:

Associate Administrator for Manned Space Flight

Limit Access to:
Cognizant NASA and
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TABLE OF CONTENTS

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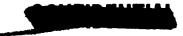
<u>Title</u>	Page
Introduction	1
Apollo Flight Mission Assignments- Little Joe II	2
Apollo Flight Mission Assignments-Saturn I	4
Discussion of Saturn IB and Saturn V Program	5
Apollo Flight Missions - Saturn IB	8
Apollo Flight Missions - Saturn V	9
Apollo Flight Mission Assignments - Saturn IB and Saturn V	10



INTRODUCTION

This document contains flight mission assignments for the Apollo/Little Joe II and Apollo/Saturn flight programs. Issue B of this document dated March 23, 1964 is superceded by this issue.

Proposed changes to this document shall be submitted to MSF for review and coordination. The Apollo Flight Mission Assignments document will be revised, as required, to reflect approved changes and to complete mission definitions.



MISSION ASSIGNMENTS	LITTLE JOE 11
FLIGHT MISSION	LITTLI
APOLLO	

SECURITY INFORMATION	TION	LITTLE JOE 11	
MISSION TYPE	гүрЕ	MAX. Q. ABORT	HIGH ALTITUDE ABORT
OBJECTIVES	/ES	1. EVALUATE LAUNCH ESCAPE VEHICLE STABILITY, STRUCTURAL PERFORMANCE AND EFFECTS OF JET PLUME IMPINGEMENT. 2. EVALUATE CANARD DEPLOYMENT AND TURN-AROUND DYNAMICS. 3. EVALUATE LES AND CM SEPARATION AND PERFORMANCE OF EARTH LANDING SYSTEM.	1. EVALUATE PERFORMANCE OF LAUNCH ESCAPE VEHICLE WITH CANARD PRIOR TO TOWER JETTISON. 2. DEMONSTRATE TOWER AND BOOST PROTECTIVE COVER JETTISON AFTER HIGH ALTITUDE RE-ENTRY ENVIRONMENT.
		4. DETERMINE AERODYNAMIC LOADS DURING LAUNCH ENVIRONMENT.	3. DETERMINE AERODYNAMIC LOADS DURING LAUNCH ENVIRONMENT.
SPACECRAFT	4 F T	BP–23 (SIMULATED BLOCK I CSM AND LES)	BP-22 (SIMULATED BLOCK I CSM AND LES)
LAU NCH VEHICLE	HICLE	3	4
LAUNCH D	DATE	DECEMBER - 1964	MAY - 1965
1531	ALTITUDE (FEET)	30,000 - 39,000	100,000 - 120,000
CONDITIONS	DYNAMIC PRESS. (PSF)	088 – 089	100 - 125
	MACH NUMBER	1.25 - 1.75	3.75 - 4.25



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APOLLO FLIGHT MISSION ASSIGNMENTS - LITTLE JOE III

TOTAL TOTAL TOTAL	KWAIION	
1	=	

i í- I	MISSION TYPE	INTERMEDIATE ALTITUDE ABORT	PAD ABORT	ABORT QUALIFICATION	FICATION
OBJECTIVES		1. DETERMINE STRUCTURAL INTECKLITY OF CAN AND BOOST PROTECTIVE COVER DURING TUMBLING ABORT. 2. DETERMINE CANARD DEPLOYMENT DURING TUMBLING ABORT. 3. DETERMINE STRUCTURAL INTECRITY THROUGH SIMULATED SATURN V LAUNCH ENVIRONMENT.	CON ALLIDUE DEMONSTRALION OF THE CANARD, SEQUENCER, AND LES JETTISON WITH BOOST PROTECTIVE COVER.	QUALIFICATION OF BLOCK II CM LAUNCH ESCAPE AND PARACHUTE RECOVERY SYSTEMS.	PE AND FERY
SPACECRAFT		002 (BLOCK 1 CSM)	010 OR BP-23 (REWORKED) (BLOCK 1 CSM) (NOTE 1)	024 (BLOCK II (NOTE 2)	(BLOCK II CSM) (NOTE 2)
LAU NCH VEHICLE	1.1	5	_	7	8
LAUNCH DATE		SEPTEMBER - 1965	FEBRUARY - 1966	1961	1967
<	ALTITUDE (FEET)	000 10 75,000	0	TO BE DE	TO BE DETERMINED
DY P PRES	DYNAMIC PRESS. (PSF)	300 TO 470	0	TO BE DE	TO BE DETERMINED
< Z	MACH NUMBER	2.4 - 3.0	0	TO BE DE	TO BE DETERMINED

NOTE 1: AFM 010 AND LITTLE JOE II #6 ARE PROVIDED AS A BACKUP FOR BP-23, BP-22, OR AFM 002. REWORKED BP-23 WILL BE MADE AVAILABLE IN CASE AFM 010 IS REQUIRED FOR A BACKUP FLIGHT ABORT MISSION.

NOTE 2: THE NEED FOR THESE FLIGHTS WILL BE DETERMINED WHEN BLOCK II CONFIGURATION IS DEFINED.

SECURITY INFORMATION

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APOLLO FLIGHT MISSION ASSIGNMENTS - SATURN I

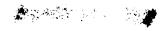
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		& ≓	PARATION)			8P-9 AND MICROMETEOROID EXPERIMENT	581 000'91	SA-10	JUNE - 1965	APPROX.				
	MICROMETEOROID EXPERIMENTS	1. MICROMETEOROID EXPERIMENTS	(1H2 PROPULSION AND STAGE SEPARATION)	DANCE.		BP-26 AND MICROMETEOROID EXPERIMENT	16,000 LBS.	SA-8	MARCH - 1965	INSERT INTO ELLIPTICAL ORBIT OF APPROX. 270/405 N.MI.	VERY.	105 DEGREES	1 YEAR	AMR
	MICROMETE	1. MICROM		3. L/V GUIDANCE.		BP-16 AND MICROMETEOROID EXPERIMENT	16,000 LBS.	5A-9	DECEMBER - 1964	INSERT INTO E 270/405 N.MI.	NO RECOVERY.			
	APOLLO DEVELOPMENT	1. L/V TECHNOLOGY DEVELOPMENT. (LH ₂ PROPULSION AND STAGE SEPARATION)	2. L/V GUIDANCE.	3. LAUNCH ENVIRONMENT.	4. DEMONSTRATE LES UNDER FLIGHT CONDITIONS.	BP-15	17,000 LBS.	SA-7	SEPTEMBER - 1964	INSERT INTO ELLIPTICAL ORBIT OF APPROX. 100/115 N.MI.	NO RECOVERY.	105 DEGREES	> 3 ORBITS	CT T Y
MATION	TYPE		ri ves			SPACECRAFT	PAYLOAD REQUIREMENT	LAUNCH VEHICLE	LAUNCH DATE		LE ILE	LAUNCH A7!MITH	DESCION	TRACKING
SECURITY INFORMATION	MISSION		OBJECTIVES			SPACE	PAYLOAD R	LAUNCH	LAUNC		PROFILE	T H O 1 1 3	LIGHT	2110

NOTE 1: REQUIREMENT IN ORBIT. THE L/V SHALL HAVE A PAYLOAD CAPABILITY WHICH EXCEEDS THE PAYLOAD REQUIREMENT BY AT LEAST THE AMOUNT REQUIRED TO CARRY A LES UNTIL JETTISONED.

SECURITY INFORMATION

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DISCUSSION OF SATURN IB AND SATURN V PROGRAM

Saturn IB and Saturn V Apollo test flights provide for launch vehicle and spacecraft development and for demonstration of crew performance. These test flights and the lunar missions are summarized on the following three charts which describe flight missions and flight mission assignments.

APOLLO FLIGHT MISSIONS

The two Apollo Flight Mission charts cover the five test mission types and the lunar mission. The three mission types shown on page 8 use the Saturn IB launch vehicle to demonstrate operation of the complete spacecraft with limited propellant loading. The first Saturn V mission summarized on page 9 verifies entry at lunar return velocity. The remaining Saturn V missions cover the lunar mission simulations and the lunar missions. Launch vehicle development objectives are included in the first mission type for each vehicle.

The charts indicate the launch vehicles and spacecraft that shall be configured for performance of each mission type. In addition to the spacecraft listed on the charts, dummy (boilerplate) spacecraft are being considered for use in the event of major space vehicle problems. Consideration is also being given to the use of Block I CSM's on vehicles 206,501 and 502.

At least two flights each of the "L/V-CSM Development" (Saturn IB) and the "L/V and Heat Shield Development" (Saturn V) missions are required for launch vehicle development objectives. Also, two flights of the "CSM-LEM Operations" mission are planned. Additional launch vehicles and spacecraft identified under



each mission type provide for contingency and/or repeated flights. The objectives of the contingency flights may be altered to focus on the problems being encountered. Repeat flights of the "CSM-LEM Operations" mission can provide crew training opportunities using the Saturn IB vehicle if required.

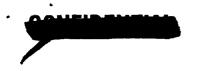
The "L/V-CSM Development" (Saturn IB) and the "L/V and Heat Shield Development" (Saturn V) missions require a mission programmer located in the CSM to achieve flight objectives. A mission programmer for the LEM shall be available for flights of the "CSM-LEM Operations" mission.

Water landings and CM recovery are to be planned for all Apollo flight test missions in the Saturn IB and Saturn V series.

APOLLO FLIGHT MISSION ASSIGNMENTS

The Apollo Flight Mission Assignments chart on page 10 shows the allocation of launch vehicles to the flight missions. The spacecraft available for assigned flight missions in the Saturn IB and Saturn V programs are also shown. The launch dates are those in the Manned Space Flight Schedules of January, 1964.

The requirement for two development flights of the Saturn IB and Saturn V launch vehicles establishes flights 203 and 503, respectively, as the first opportunities for the manned "CSM Long Duration Operation" (Saturn IB) and the manned "Lunar Mission Simulation" (Saturn V) missions. Availability of the LEM and a CSM with docking facilities sets flight 206 as the first opportunity for a manned "CSM-LEM Operations" (Saturn IB) mission. If LEM's and CSM's with docking structures become available for use on flights prior to 206, consideration will be given to combining unattained objectives of the "CSM Long Duration"



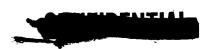
Operations" mission with the "CSM-LEM Operations" mission.

It is planned that spacecraft test flights on the Saturn IB will be transferred to the Saturn V as soon as that vehicle is capable of being manned. As a result, Saturn IB launch vehicles may become available for other uses. Consideration is being given to alternate payloads for Saturn IB vehicles 207 through 212.

Launch schedules during the period of overlap between the Saturn IB and the Saturn V programs will be adjusted, where required, to conform to the availability for launch of six complete spacecraft per year.

Where alternate missions have been assigned to the same launch vehicle, the spacecraft and the launch vehicle shall be capable of performing either mission. In addition, all spacecraft shall be capable of flight missions on either the Saturn IB or Saturn V launch vehicle without significant modification.

In succeeding issues of this document the missions will be defined further. In addition, requirements for major program decisions, including lead times, will be identified.



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APOLLO FLIGHT MISSIONS - SATURN IB

						The discontinuous and the second	SINOTE BATTONIS	NO CITA WAR	SNC1148
MISSION TYPE	NIYPE		L/V - CSM DEVELOPMENT	VELOPMENT		CSM LONG DORALLON OFFICIAL	ON OFERSHOLDS		
		1. L/V DEVELO	V DEVELOPMENT.	İ		1. MAN/SYSTEM INTERFACES.	ACES.		
		2. S-IVB AND	S-IVB AND INSTRUMENT UNIT CHECKOUT.	IIT CHECKOUT.		2. DEMONSTRATE CREW/CSM/GROUND SYSTEMS PERFORMANCE FOR EXTENDED	/CSM/GROUND JCE FOR EXTENDED	2. CREW TRANSFER. 3. VERIEICATION OF TEM SYSTEMS	S W
		3. COMPATIE	BILITY AND STRUC	TURAL INTEGI	RITY OF	MISSION.			
			CSM-SATURN 18.			3. S-IVB AND INSTRUME	S-IVB AND INSTRUMENT UNIT CHECKOUT	4. RENDEZ VOUS AND DOCK.	
OBJECTIVES	TIVES	4. VERIFICAT (RCS, SCS, AND G &	VERFICATION OF CSM SYSTEMS OPERATION (RCS, SCS, SPS, ECS, EPS, COMMUNICATIONS, AND G & N SYSTEMS).	STEMS OPERATI	ON ONS,			5. CREW/LEM/GROUND SYSTEMS OPERATION VERIFICATION.	TEMS N.
		5. HEAT SHII 29,000 FP	HEAT SHIELD VERIFICATION AT APPROXIMATELY 29,000 FPS:	N AT APPROXIA	AATELY			6. MAN/SYSTEM INTERFACES.	·
		(A) (B) AM	MAX, HEAT RATE. MAX, HEAT LOAD.						
		CSM (BLOCK I)	LEM	CSM (BLOCK I)	LEM	(BLOCK 1)	LEM	CSM (BLOCK II)	LEM
SPACECRAFT	CRAFT	009, 012,014 015		011,012		012,014 015		021,025,032, 030,034 (NOTE 4)	1, 1,3,4,5
PAYLOAD	OAD					, , , , , , , , , , , , , , , , , , ,			
REQUIREMENT	EMENT	39, 500 LBS. (NCN ORBITAL)	LBS. (BITAL)	(NOTE 2)	(NOTE 2)	25,000 (85,	· ·	35,500 LBS. (NOTE 3)	.3)
LAUNCH	CH LES	201,203 ТН	201, 203 THROUGH 205	202 THRC	202 THROUGH 205	203 THROUGH 205	GH 205	206 THROUG (NOTE 3)	206 THROUGH 21((NOTE 5)
			1		н				
		POWERED FLI	IGHT OF L/V	POWERED FL	IGHT OF L/V	INSERT INTO 105 N. M.I. CIRCULAR ORBIT.	11. CIRCULAR ORBIT.	INSERT INTO 105 CIRCULAR ORBIT.	INSERT INTO 105 N. MI. CIRCULAR ORBIT.
3 13 0 9 9	<u>u</u>	ON NON-O SUPER-CIRCU "LOB-TYPE"	ON NON-ORBITAL SUPER-CIRCULAR ENTRY "LOB-TYPE" TRAJECTORY	ON NON-C SUPER-CIRCL "LOB-TYPE'I	ON NON-ORBITAL SUPER-CIRCULAR ENTRY "LOB-TYPE'TRAJECTORY	CSM/S-IVB SEPARATION.	N. IGHER ORBIT REQUIRED	FRANSPOSITION AN SPACECRAFT/ S-1VB CEPARATICIN.	TRANSPOSITION AND DOCK. SPACECRAFT/ S-IVB SEPARATION
		CSM/S-IV B SEPARATION.	SEPARATION,	CSM/S-IVB S	CSM/S-IVB SEPARATION.	FOR LONG DURATION	FOR LONG DURATION MISSION.	ı	Ħ
T Y P ES	S .	USE SPS TO ACHIEVE DESIRED ENTRY CONDITIONS FOR MAX.	ACHIEVE RY S FOR MAX.	USE SPS TO ACHIEVE DESIRED ENTRY CONDITIONS FOR M.	USE SPS TO ACHIEVE DESIRED ENTRY CONDITIONS FOR MAX.	DE-ORBIT WITH SPS. ENTRY.		DOCKING OPERATIONS. RENDEZVOUS AND DOCK. (CSM ACTIVE) 1EM PROPULSION	RENDEZ VOUS AND DOCK OPERATIONS. (LEM ACTIVE)
		HEAT RATE.		HEAT LOAD				OPERATIONS. DE-ORBIT	 DE-ORBIT WITH SF5.
								ENTRY.	
10,0113	LAUNCH AZIMUTH	105 DE	105 DEGREES	(NC	(NOTE 2)	72 DEGREES	REES	72 DEGREES	GREES
4140			1		1	UP TO 14 DAYS	DAYS	UP TO 3 DAYS	AYS
	TRACK ING NETWCRK	AMR	4R	ON)	(NOTE 2)	MSFN	7	MSı	MSFN

NOTE 1: WEIGHT OF SPACECRAFT AND ADAPTERAT LY/SC SEPARATION. THE L.V SHALL HAVE A PAYLOAD CAPABILITY WHICH EXCEEDS THE PAYLOAD REQUIREMENT BY AT LEAST THE AMOUNT REQUIRED TO CARRY A CONTROL WEIGHT LES OF 8, 200 LBS, UNTIL JETTISONED.

NOTE 2: UNDER STUDY.

NOTE 3: PAYLOAD REQUIREMENT IS UNDER STUDY

NOTE 4: USE OF A BLOCK I CSM AND A CHANGE IN PROFILE TYPE IS UNDER STUDY FOR 206.

NOTE 5: 211 AND 212 ARE PROVIDED AS BACKUP LAUNCH VEHICLES.

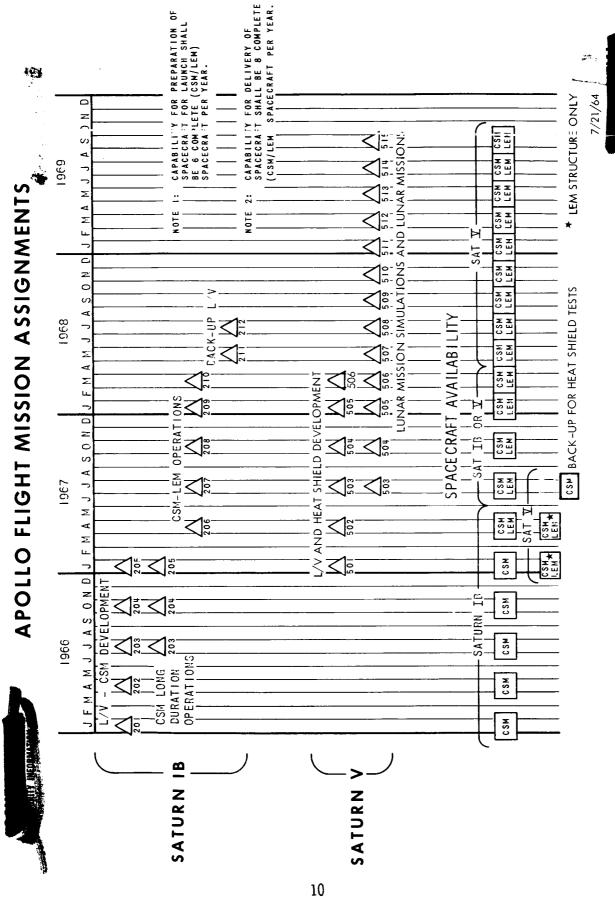


SECURITY	THE SEMATION		AF	APOLLO FLIGHT MISSIONS -	HI MISSI	ONS - SAIOKN V	
MISSI	MISSION THE	L/V & HEAT SHIE	L/V & HEAT SHIELD DEVELOPMENT			LUNAR MISSION SIMULATIONS AND LUNAR MISSIONS	
OBJE	OBJECTIVES	1. L/V DEVELOPMENT. 2. COMPATIBILITY AND STRUCTURAL INTEGRITY OF SPACECRAFT - SATURN V. 3. HEAT SHIELD VERIFICATION A 36,000 FPS. 4. VERIFICATION OF LAUNCH AND GROUND SUPPORT EQUIPMENT.	LV DEVELOPMENT. COMPATIBILITY AND STRUCTURAL INTEGRITY OF SPACECRAFT - SATURN V. 50,000 FPS. 50,000 FPS. AND GROUND SUPPORT EQUIPMENT.		- '-'	CREW/SPACE VEHICLE/GROUND SYSTEMS VERFICATION DURING SIMULATED LUNAR MISSION. LUNAR EXPLORATION.	EMS UNAR
		CSM (BLOCK II)	IEM	CSM (BLOCK II)	LEM	(8LOCK 11)	LEM
SPACI	SPACECRAFT	018,023	STRUCTURE, STRUCTURE,	025	2	032,030, 034,036, 037,038	3,4,5,6,7,8
PAY REQUI	PAYLOAD REQUIREMENT	00)	85,000 LBS. (NOTE 2)	85,000 LBS. (NOTE 2)	LBS.	94, 0C (NO	94,000 LBS. (NOTE 3)
LAU VEH	LAUNCH VEHICLES	501 THRC	501 THROUGH 506	503	3	504 THRO	504 THROUGH 515
A T O Y	PROFILE TYPES	INSERT INTO 100 N. MI. CIRCULAR (AFTER ORBITAL CHECKOUT FOR 1-3 (INJECT INTO ELLIPTICAL TRAJECTOR CSM/5-1V8 SEPARATION. USE SPS TO ACHIEVE DESIRED ENTRY CONDITIONS.	INSERT INTO 100 N. MI. CIRCULAR ORBIT. AFTER ORBITAL CHECKOUT FOR 1-3 ORBITS, INJECT INTO ELLIPTICAL TRAJECTORY. CSM/5-1V8 SEPARATION. USE SPS TO ACHIEVE DESIRED ENTRY CONDITIONS.	SIMULATION PROFILE TO BE DEVELOPED	TION LE OPED	SIMULATIONS PROFILE TO BE DEVELOPED	LUNAR MISSIONS INSERT INTO 100 N. M.: CIRCULAR ORBIT. AFTER ORBITAL CHECKOUT OF 1 - 3 ORBITS, INJECT INTO TRANSLUNAR TRAJECTORY. TRANSPOSITION AND DOCK. SPACECRAFI/S-IVB SEPARATION. MIDCOURSE CORRECTIONS AND DEBOOST INTO LUNAR ORBIT BY 5FS. LEM SEPARATION, DESCENT AND TOUCHDOWN. LUNAR LAUNCH, RENDEZVOUS AND DOCK. LEM SEPARATION.
							ONE TO MIDCOURSE CORRECTIONS.
(HO)	LAUNCH AZIMUTH	72 DEGREES	GREES	72 DEGREES	SREES	72 DEGREES	72 TO 108 DEGREES
DATA	_	1 - 3 <	1 - 3 ORBITS	7-10 DAYS	DAYS	7-10 DAYS	DAYS
	TRACKING NETWORK	MSFN	Z	MSFN	z	MSFN	Z.

9

NOTE 1: CSM 029 IS A BACK-UP FOR HEAT SHIELD TESTS. USE OF A BLOCK I CSM FOR 501 AND 502 IS UNDER STUDY.





SECURITY INFORMATION